

SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Gas Generator

PART NO.: 5905078  
Alt: 5905067  
Alt: 58727  
Alt: 5903456

FM CODE: A03

ITEM CODE: 20-01-16

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Seconds

NUMBER REQUIRED: 2

DATE: March 1, 2002

CRITICAL PHASES: Final Countdown, Boost

SUPERCEDES: March 1, 1999

FMEA PAGE NUMBER: A-59

ANALYST: R. Imre/ S. Finnegan

SHEET 1 OF 3

APPROVED: S. Parvathaneni

FAILURE MODE AND CAUSES: Rupture (System A and/or B)

- o Material defect
- o Manufacturing defect

FAILURE EFFECT SUMMARY: Fire and explosion will lead to loss of mission, vehicle and crew.

REDUNDANCY SCREENS AND MEASUREMENTS: N/A

RATIONALE FOR RETENTION:

A. DESIGN

- o The Gas Generator is designed and qualified in accordance with end item specification 10SPC-0050. (All failure causes)
- o Material selection is per MSFC-SPEC-522A. (Material defects)
- o Body and nozzle material is Hastelloy B per PRC-MS-0135. (Material Defect)
- o Qualification testing verified design requirements as reported in Sundstrand Qualification Test Report AER-1539-6, Rev. B. (All Failure Causes)

B. TESTING

- o Acceptance testing is performed per General Dynamics OTS Aerospace ATP TP 0600, prior to installation in the APU. (All Failure Causes)

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- o Acceptance testing is performed per Sundstrand ATP TS 2409 on all new flight units. This includes a mission duty cycle hotfire (paragraph 4.3) (All Failure Causes)
- o During refurbishment proof pressure of gas generator housing is done every fifth flight. (All Failure Causes)
- o During refurbishment and prior to reuse, the gas generator is subjected to the same Sundstrand ATP standards as new units per TS 2409. (All Failure Causes)
- o TVC system functional test is performed during hotfire operations to demonstrate proper function per 10REQ-0021, para. 2.3.16. (All Failure Causes)

C. INSPECTION

VENDOR RELATED INSPECTIONS

- o Vendor inspection and test records are verified per SIP 1491 by USA SRBE QAR. (All Failure Causes)
- o Verification of proper operation per SIP 1491, by USA SRBE QAR. (All Failure Causes)
- o Source inspection plan verifies proper manufacturing and assembly per SIP 1491. (Manufacturing defects)
- o Verification of material certifications per SIP 1491 by USA SRBE QAR.(Material Defects)
- o Witnessing of acceptance testing per SIP 1128 at Sundstrand and SIP 1491 at General Dynamics OTS Aerospace by USA SRBE QAR. (All Failure Causes)
- o Verifications that are required on new units are performed on refurbished units per SIP 1491 by USA SRBE QAR. (All Failure Causes)
- o Critical Processes/Inspections:
  - Welding per RRC-PS-0212
  - Heat treat per RRC-PS-0208
  - Dye Penetrant per RRC-PS-0244
  - Ultrasonic inspect per RRC-PS-0044

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KSC RELATED INSPECTIONS

- o Proper function of TVC system is demonstrated during hotfire operations per 10REQ-0021 to include hotfire, para. 2.3.16. (All Failure Causes)
- o Inspection for leaks, rubbing and discoloration are conducted per 10REQ-0021, following low speed spin, sequence para. 2.3.11.3 and following high speed spin sequence para. 2.3.15.5. (All failure causes)

- o Hydrazine is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board hydrazine circuits per OMRSD File V, Vol. I, requirement number B42AP0.010. (Material defects)
- o GN2 is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board hydrazine circuits per 10REQ-0021 para. 2.3.2.2 and OMRSD File V, Vol. I, requirement number B42AP0.012. (Material defects)

D. FAILURE HISTORY

- o Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- o Not applicable to this failure mode.